Annex I: Explanation of asymmetric excitations in Au/Si nanorods

As it has been stated in the project, the thinnest Au/Si nanorods (309, 329 nm) present asymmetries in the CL intensity emission maps. Figure 28a shows the asymmetries differentiated in regions for the 329 nm-diameter nanorod. One possible explanation encountered for this anomaly is the non-homogeneous Au deposition in the top surface of these nanorods. It is important to notice that both belong to the same array. To prove quantitatively that this asymmetry is a matter of physical inhomogeneities and it is not related with higher order mode resonance contributions, Figure 28b shows the CL intensity spectra obtained for the 309 nm-diameter nanorod averaged over the blue region (black line) and over the green region (red line). One can notice that CL intensities are brighter in the blue region (increment of about 30 % with respect to the green region) while both regions present the same shape and the same wavelength resonant peak positions. Therefore, regarding that the Au has excellent conductive properties and it is by far more luminous than the Silicon, we can conclude that the Au thickness of the low-half region is considerable less than in the up-half one, bringing about less brightness in the low-half part of the CL intensity emission maps.

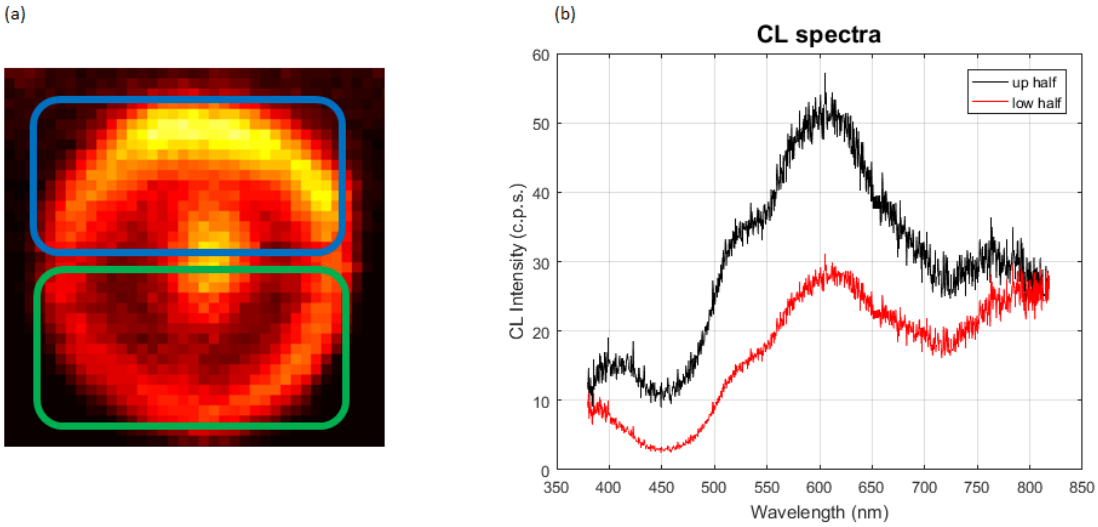

Figure 28. (a) The blue region is considered the up-half and the green region the low-half of the nanorod's surface. (b) An average of a 30 % less intensity encountered in the low-half region for the 309 nm-diameter nanorod.